

Interactive tasks as a means of theoretical training in physical education of students

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Abstract

Background and Study Aim The research background is the challenges faced by Ukrainian educators, such as distance learning, martial law, and the digitalisation of the educational space. The purpose of the research is to determine the influence of interactive tasks in physical education on students' mastery of the theoretical material through distance learning.

Material and Methods The research involved first-year students (n=245). Students were divided into three groups: experimental group 1 (n=86), experimental group 2 (n=81), control group (n=78). The research was conducted over seven months of the 2022-2023 academic year. At the beginning and end of the research, a survey was conducted to determine interest in the discipline of "physical education". The essence of the experiment was to provide theoretical information to students using various methods and forms. During the experiment, students' theoretical preparedness was tested three times (using Google Forms). The research results were processed using licensed Microsoft Excel spreadsheet packages. The relationship between the indicators was established using correlation analysis. The reliability of differences in mean values was assessed by Student's criterion, and the difference was considered significant at $p < 0.05$.

Results The low level of students' interest in physical education was established (52%). 19% of students consider the role of physical education to be important for maintaining personal health. There is a close and medium correlation between students' subjective interest in the discipline "Physical Education" and their opinion about the importance of this discipline for their further professional activity and for maintaining their own health. The results of all theoretical tests in both experimental groups were significantly better than the results of the control group ($t=13.479-2.049$). The level of interest in physical education among students in both experimental groups increased after the experiment.

Conclusions The use of interactive tasks in physical education classes has a positive effect on the effectiveness of students' studying and mastering of theoretical material. The interactive games increased students' cognitive motivation, interest in personal health, and responsibility for their own activities to achieve results.

Keywords: physical education, students, higher education, interest, interactive tasks, teaching methods.

Introduction

The analysis of the possibilities of health-improving pedagogical technologies in the process of improving students' health shows that teaching a practical discipline distantly (online) still causes enough difficulties. Today in Ukraine, there are cases of loss of electricity and internet, and frequent air raid alarms. Many students have changed their place and conditions of stay. All of this makes it possible to utilize the potential of physical exercise only to a minimal extent.

The question of the feasibility of the traditional organization of education is increasingly being

raised by university professors. The development of education requires teachers to study and implement new teaching methods that will contribute to the formation of the necessary competencies in students [1, 2]. This is almost impossible to achieve without their commitment to self-improvement, self-education, and self-development. Bondar [3] notes that the combination of classical, active, and interactive methods allows for a higher level of student activity, increased learning motivation, and higher levels of learning material assimilation. The author recommends using such methods and forms of classes as independent work, creative exercises, and interactive games.

Dzhurynskyi's research [4] showed examples of the use of such teaching methods as "brainstorming",

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problem lectures, heuristic conversations, and situational modelling. The author notes that the use of these interactive teaching methods contributes to the formation of sustainable motivation for physical education, health promotion, and mass sports activities. This approach to teaching helps to: acquire special knowledge of pedagogy, physical education, and the regulatory framework; study key concepts in the theory and methodology of physical education, and promote a healthy lifestyle.

According to other authors [5], positive changes in the activation of students' cognitive activity through the implementation of independent work of a creative and active nature have been established. The authors suggest completing tasks through interaction with classmates, the information field, and social networks.

The importance of interactive teaching methods is emphasized in other studies. For example, Vaskov et al. [6] revealed the theoretical foundations and features of the practical implementation of the interactive method "Joint Project". This method has improved the quality of students' learning processes. The method is based on activating the involvement of all students in cooperation in learning, enabling each student to express their own opinion. Marchenko et al. [7] provide a detailed description of interactive teaching methods that they recommend for use with students. The authors emphasize that such teaching methods contribute to: diversification of the educational process; and the development of students' cognitive interests and teamwork skills. The methods create an educational environment in which theory and practice are learned simultaneously. This approach contributes to the formation of students' critical and logical thinking.

According to research by Hidayat et al. [8] and Bellaera et al. [9], motivation for active learning; use of dialogue-based exercises; interaction between students and teachers positively influenced the development of students' critical thinking skills in the physical education field. Carr et al. [10] propose active online learning methods through interaction between students and teachers. This approach significantly reduced the difference in performance between offline and online students.

Another study indicates that in order to increase students' cognitive activity and interest in self-education, it is necessary to improve the teaching of the theoretical section of the physical education course [11]. The author proposes to realize this through the involvement of new information technologies and modern teaching methods. It has been found that increasing motivation to obtain and master theoretical knowledge contributes to the effectiveness of physical exercises. The absence or low level of theoretical knowledge in physical education dramatically reduces the effectiveness

of teaching and education and weakens interest in physical exercise.

A detailed analysis of the motivational aspect of students' physical activity through the theory of self-determination is shown in the research of Ntoumanis et al. The authors note that one of the ways to get students interested in physical activity is to provide reasonable information about the benefits of physical activity. The authors emphasize creating conditions for students to interact with each other, the teacher, and other educational spaces.

The above information indicates an increased demand in the educational environment for the use of interactive methods in the organization of offline and online learning. Special attention should be paid to the peculiarities of using the latest methods of online learning in teaching the practical discipline of "physical education".

The purpose of the research is to determine the influence of the introduction of interactive tasks in physical education on the level of mastering the theoretical material by students and their interest in classes during distance learning.

Tasks:

1. To choose a publicly available location of electronic materials and to create interactive tasks and video presentations for each topic of theoretical blocks of the program "Physical Education" for students.
2. To conduct a survey to determine interest in the subject "physical education" among first-year students.
3. To implement interactive tasks and video presentations of physical education classes and to test their influence on the level of students' theoretical knowledge and interest in the subject.

Materials and Methods

Participants

The research involved 245 first-year students. The students were divided into three groups: experimental group 1 (n=86), experimental group 2 (n=81), and the control group (n=78). Informed consent was obtained from all participants to participate in this experiment and to post video materials about their participation in accordance with ethical standards.

Research Design

The research was conducted over seven months of the 2022-2023 academic year. At the beginning and end of the research, a survey was conducted to determine interest in the discipline of physical education. The survey was conducted using Google Forms, in which students had to mark from 1 to 9 points their attitude toward the proposed questions. 1-3 points were assessed as a low level, 4-6 as an average level, and 7-9 as a high level.

Pedagogical experiment: theoretical information for students of experimental group 1 (EG1) was covered through videopresentations at the beginning of the class. The theory was provided through a search or problem-based method for solving interactive tasks (Table 1) and was supplemented by video presentations on some topics for students of experimental group 2 (EG2). At the end of the lesson, another interactive task was offered to consolidate the theoretical information provided during the lesson. The theoretical information was provided by the teacher only verbally at the beginning of the class or during the class for students in the control group (CG).

For seven months of the pedagogical experiment, the students' theoretical preparedness was tested three times (using Google Forms). The questions revealed information about three modules offered for mastering during physical education classes. Each of the tests consisted of 20 questions. Students

received 1 point for a correct answer, and 0 points for an incorrect answer.

The content of the practical and theoretical parts of the classes in all three groups was the same. The methods of presenting theoretical information to students were different. Classes were held remotely on the Google Meet online conference platform.

Statistical analysis

The research results were processed using Microsoft Excel. The relationship between the indicators was established using correlation analysis. The reliability of differences in mean values was assessed by Student's t-test, the difference was considered significant at $p < 0,05$.

Results

Students didn't highly mark their interest in the discipline "physical education" at the beginning of the research (fig. 1).

Table 1. Examples of interactive tasks on different topics of the curriculum

Topics of the curriculum	Links to interactive tasks
Physical training, development of physical qualities	https://learningapps.org/view28516070 https://learningapps.org/watch?v=py3izkt8c23
Development of physical qualities by means of various sports	https://learningapps.org/watch?v=p2x4pxggn23 https://learningapps.org/watch?v=p2q04d1tn23
Preventive and recreational exercises	https://learningapps.org/watch?v=py8oozyqj23

Note: The following interactive online tasks (links to them) were prepared on the learningapps.org platform and are available for viewing and completion both on mobile devices (phones and tablets) and personal computers.

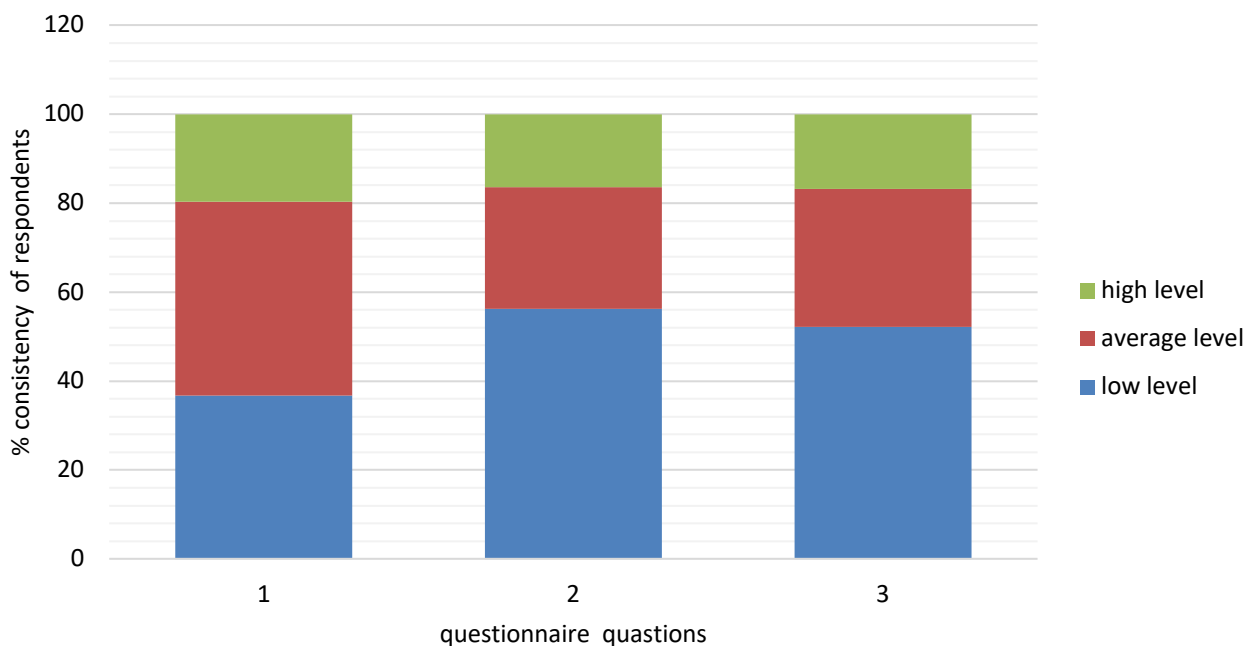


Figure 1. Interest in physical education and its role in students' life and professional activity: 1 - the importance of physical education for maintaining personal health; 2 - importance of physical education for your further professional activity; 3 - personal interest in physical education

Only 19% of students place the role of physical education in maintaining health at a high level. 56% of students put the importance of physical education for further professional pedagogical activity at a low level of importance. 52% of students admit to having low interest in physical education.

There is a close and medium correlation (Table 2) between students' subjective interest in the discipline "Physical Education" and their opinion about the importance of this discipline for their further professional activity and personal life to maintain their own health.

The students' interest in the classes is directly related to their subjective understanding of the place of this discipline in their future professional activities (Table 2). During the pedagogical experiment, theoretical preparedness on the topics studied was tested three times (Fig. 2).

Students in the control group (Fig. 2) showed an improvement in their results ($t=5.699$) in the first two tests. There was no significant difference between the results of the second and third tests ($t=1.723$).

A similar trend is observed with the results of EG1: after the first test, the average number of points increased ($t=6.366$).

For EG2 students, the average results of all three

tests had approximately the same number of correct answers ($t=1.962$). There was no improvement between the results of the second and third tests ($t=1.902$).

According to the results of the first test on theoretical proficiency, EG2 students had a significantly higher mean score of correct answers than CG ($t=13.479$) and EG1 ($t=12.515$).

Although there was a difference between the results of the second and third tests in the results of EG1 and EG2, it wasn't statistically significant ($t=1.902$ and 1.951 , respectively).

The results of students in the control group in the second and third tests were significantly lower than those of the experimental group 1 ($t=2.049$ and 2.143 , respectively) and the experimental group 2 ($t=9.181$ and 9.543 , respectively).

The results of the students' survey on their interest in physical education are shown in Fig. 3. The results of the CG remained almost unchanged compared to the first survey. The interest of students in EG1 and EG2 increased slightly (Fig. 3).

Discussion

The results of our research confirm the opinion of other authors [1, 2, 13, 14] about the need to find new, non-standard methods, means, and approaches

Table 2. Correlation between the results of the survey of higher education students on the importance of the discipline "Physical Education" (r)

Questionnaire indicators	Importance of physical education for maintaining your health (points)	Importance of physical education for maintaining your health (points)
Your personal interest in physical education (points)	0.973	0.485

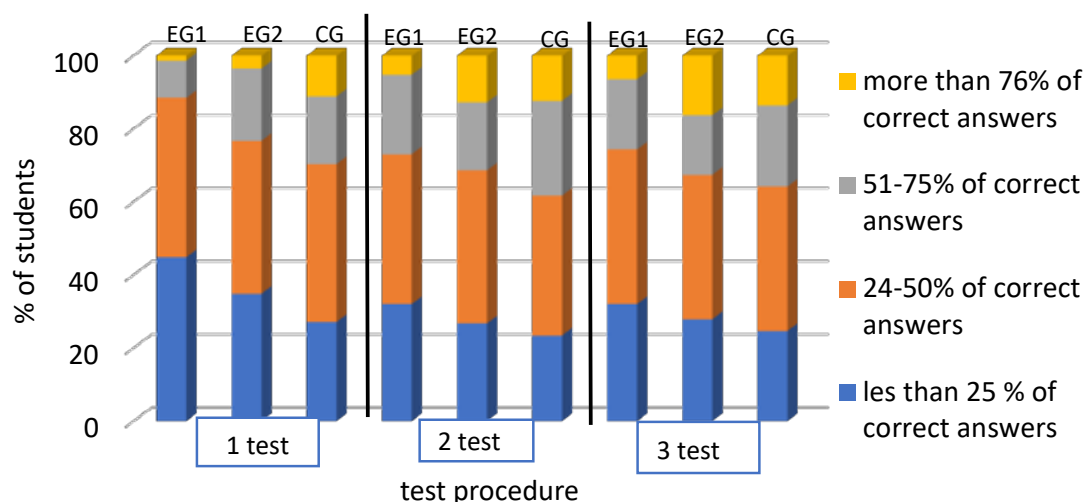


Figure 2. The level of students' theoretical preparedness on different topics of the curriculum (% of students): CG - control group; EG1 - experimental group 1; EG2 - experimental group 2

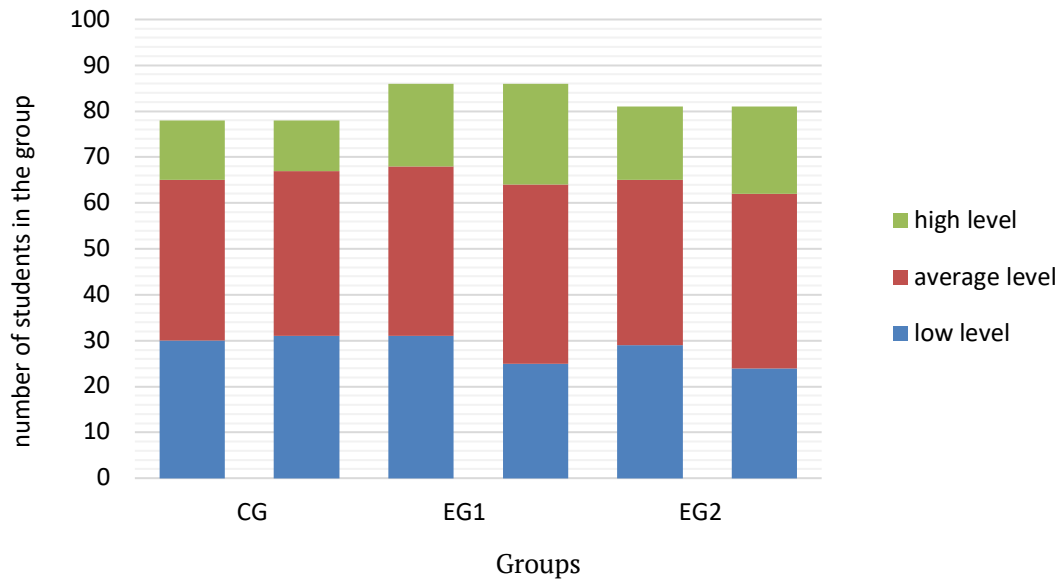


Figure 3. Students' interest in physical education at different stages of the research: 1 - at the beginning of the research; 2 - at the end of the research

to implement effective learning.

Our results indicate that the introduction of interactive methods in the process of teaching students increases the efficiency of learning theoretical information. The positive impact of online interactive tasks is noted by Crisp [15]. The author points out that the use of such tasks in theoretical testing is a very effective means of learning. Students are looking for ways to correct them on their own, which is important in learning. Abdelsamie [16] also calls interactive online assessments a good way to teach students. The author notes that this form of assessment can help students retain information and test their understanding of the material in a more engaging and interactive way. With this approach, teachers additionally meet students' needs for digitalization in the process of acquiring new knowledge.

We proposed similar interactive tasks as a variant of formative assessment. The main purpose of such tasks was the absence of assessments. It was necessary to find the right solution to the proposed situations by trying and correcting mistakes. The use of such tasks in our research led to an improvement in the theoretical preparedness of student teachers in the field of physical education.

The data we obtained indicate that students don't consider gaining knowledge of physical education, disease prevention, methods and ways of recovery and relaxation, as well as improving their physical performance, important for themselves and their future professional activities. The lack of interest in physical activity is also mentioned by Homon et al. The author emphasizes the decline in the level of health of Ukrainians and life expectancy. It is noted that pupils recognize their low interest in physical activity against the background of a

growing number of pupils who are excused from school. Kirch et al. [17] point to a decrease in students' motivation for physical education and recommend that teachers choose the content of classes based on students' motivations for physical activity. Cantos [18] describes a similar problem in her work. The author emphasizes the need to take measures to encourage the interest of the university community to participate in and develop physical education programs.

Bevans et al. [19] identify factors that influence students' participation in physical education: student engagement and perception of competencies in the physical education field. The authors point out that practical performance of tasks positively contributed to students' involvement in physical education, and inactive learning was negatively associated with student involvement. These effects were especially pronounced among students who didn't consider the development of competencies in the field of physical education important for themselves. Similar findings are shown in the research by Dzhurynskiy [4] and Nesen et al. The authors point to a significant increase in interest in learning and its effectiveness when using interactive teaching methods and techniques that promote student activity and interaction with classmates, teachers, and the educational space. Our study shows similar findings. We found changes in students' interest in physical education after a non-standard way of presenting theoretical information. This approach forced students to interact with digital devices and solve problematic issues related to new information on physical education.

Scheiter et al. [20] reveal the peculiarities of using different ways of visualizing information for students during their studies. The authors note

that this approach will not always have a positive result. The authors provide the criteria under which learning through visualization will be of high quality. The video presentations used in our research took these criteria into account. They consisted of visual images and verbal explanations. All this was combined into one video sequence. Such presentations helped to attract students' attention and interest to the methodological part of the lesson, helping them to better master and deepen their knowledge.

In our research, we found evidence of increased interest in physical education among students who had higher results in theoretical tests. This is confirmed by the results of the study by Gordienko [11]. The author points to a close connection between the assimilation of theoretical information on physical education and students' practical interest in such classes. That is, it becomes more interesting for students to perform the proposed movements when they understand their structure, technique, and benefits to the body. If you do the exercises without realizing it, the student will not get the intended effect and will not feel their benefits. This will lead to a decrease in interest in physical activity in general.

We agree with the opinions of other authors [21, 22, 23, 24] about the need to find ways to combine new and time-tested teaching methods in the modern educational process. Today, this problem is being developed and studied quite actively. We believe that the issue of selecting options and means of interaction with students in the format of distance learning has not yet been sufficiently

studied in practical disciplines. Such a discipline is "physical education" for university students. Our research shows one of the options for improving the educational process of this discipline in view of distance learning and modern student demands for digitalization of the environment.

Practical recommendations

The use of interactive online tasks in the form of game-based assessments at the beginning or end of classes will help to consolidate the acquired knowledge. Such tasks, along with video presentations, will increase the effectiveness of learning in general by forming a conscious approach to physical education.

Conclusions

It has been established that the use of interactive tasks in physical education classes has a positive effect on the effectiveness of students' studying and mastering of theoretical material. Interactive games increase students' cognitive motivation and responsibility for their own activities to achieve results. They also become more interested in personal health.

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